

# INJURIES IN ALPINE SKIING RELATED TO AGE GROUPS

S. Heir<sup>1,2</sup>, T. Krosshaug<sup>1</sup>, A. Rødven<sup>3</sup>, A. Ekeland<sup>2</sup>

<sup>1</sup>Oslo Sport Trauma Research Centre, Oslo, Norway

<sup>2</sup>Martina Hansens Hospital, Bærum, Norway,

<sup>3</sup>Norwegian Ski Lift Association, Oslo, Norway

**Introduction:** The purpose of the current study was to document the injury patterns in children ( $\leq 12$  years of age), adolescents (13 – 19) and adults ( $\geq 20$ ).

**Material & Methods:** A central ski patrol-based registration of alpine skiing injuries was performed by the Norwegian Ski Lift Association during the 4 winter seasons 1996/97 through 1999/00. The injured skiers were registered by age and nationality. Skiing ability was registered into 1 of 4 categories according to self-reported ability to perform different turns. The site and type of injuries, as well as the use of helmet was registered. In this paper only injuries on alpine skis are reported.

**Results:** A total of 4548 alpine skiing injuries were recorded during the 4 seasons. 1042 (23%) of the injuries occurred in children, 1108 (24%) were adolescent injuries, and 2398 injuries (53%) occurred among adults. Eighty percent of the injured children were beginners or intermediate skiers, 20 % were advanced or expert skiers. The corresponding numbers for injured adolescents and adults were 68/32 and 58/42 respectively ( $p < 0.001$ ). In the children the most common injury sites were the lower leg (21.7%), the knee (20.5%) and the head (17.1%). In the adolescents the most common injury locations were the knee (24.4%), the head (19.6%) and the hand (12.3%). Among the adults the most common injury sites were the knee (31.1%), the head (15.3%) and the shoulder (14.5%). The most common type of injury was a contusion in all three age groups, counting for 41.4% of the injuries in children, 39.8% of the injuries in adolescents and 31.7% of the injuries in adults. Fractures were the second most common injury in children (25.5%) followed by distortions/sprains (21.9%), whereas distortions/sprains were the second most common injury in adolescents and adults (29.4% and 27.8% respectively), followed by fractures (17.4% and 20.8%). Sixty-six percent of the injured children were using helmets, whereas only 9.3% of the injured adolescents and 2.6% of the injured adults were using helmet ( $p < 0.001$ ).

**Discussion:** In the present study we found the knee to be the most common injury site regardless of age. This agrees with other studies of injuries in alpine skiers. Second to contusions, fractures was the most common injury type in children and the most common injury site in children was the lower leg. This too is in agreement with previous studies reporting a high percentage of lower leg fractures in injured children. Sixty-six percent of the injured children were using helmets. In Norway there has been campaigns going on to increase the number of children using helmets. The use of helmets is however still controversial. Skiing ability has previously been shown to be the most important risk factor in alpine recreational skiing. In this study, 65.4% of the injured population was beginners or intermediates, whereas 34.6% was either advanced or expert skiers. A weakness of this study is the lack of a control population of uninjured skiers. In addition, a ski patrol based injury material may have a lower diagnostic accuracy than a physician based material.

**Summary:** In the present Norwegian multicenter study knees and head were main sites of injury in alpine skiers regardless of age. Fractures were a more common type of injury in children than among injured skiers of the older age groups.